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Two new species of the open-holed trapdoor spider genus *Aname* (Araneae: Mygalomorphae: Anamidae) from southern Australia

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Abstract

The open-holed trapdoor spider genus *Aname* L. Koch, 1873 is endemic to Australia, and currently contains 46 named species. We describe two new species from southern Australia: *Aname elegans* sp. nov. from the Gawler bioregion of South Australia and *Aname pulchella* sp. nov. from the Mallee and Hampton bioregions of southern Western Australia.

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ZooBank LSID: http://zoobank.org/References/E1E9A98E-658B-4563-A2D4-7B391D198849

Introduction

The spider family Anamidae is endemic to Australia where it has diversified into numerous different habitats including tropical rainforests, deserts and caves. The family currently comprises 10 genera which are included in two subfamilies, Anaminae and Teylinae (Harvey et al. 2018, 2020b; Opatova et al. 2020). The most diverse anamid genus, *Aname* L. Koch, 1873, has a distinct morphological feature, the ventral asetose depression on the male pedipalpal tibia (Harvey et al. 2018). The genus is currently represented by 46 described species (e.g. Raven 1985a; Harvey et al. 2012; Castalanelli et al. 2020; Harvey et al. 2020a), but there are numerous undescribed species that have been recognized using molecular and morphological data (Castalanelli et al. 2014; Harvey et al. 2018; Rix et al. 2021; MSH, MGR, unpublished data).

To further document the genus *Aname* in Australia, we here describe two new species from southern Australia. These species were included in a recent multi-locus molecular phylogeny of the genus *Aname* (Rix et al. 2021) and are both members of the Temperate-Eastern Radiation.

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This project represents a contribution to Taxonomy Australia (2020), a national initiative organised under the auspices of the Australian Academy of Science that brings together the taxonomic community to develop approaches that will significantly increase the rate at which new species are discovered, resolved and named, with a view to completely documenting the Australian biota within a generation.

Methods

The specimens examined in this study are lodged in the South Australian Museum, Adelaide (SAM) and the Western Australian Museum, Perth (WAM), and are preserved in 75% ethanol. Auto-montaged images were taken at different focal planes (ca. 20–30 images) with a Leica DFC500 digital camera attached to a Leica MZ16A stereo microscope, using Leica Application Suite (LAS) version 2.5.OR1 software.

Terminology follows Raven (1985a, 1985b) and Castalanelli et al. (2020). The following abbreviations are used: AME: anterior median eyes; ALE: anterior lateral eyes; PLE: posterior lateral eyes; PME: posterior median eyes. Pedipalp and leg measurements and ratios were calculated using the terminology and reference points defined by Castalanelli et al. (2020).

Morphological characters were scored using DELTA 1.4 (CSIRO, Canberra, Australia) (Dallwitz et al. 2010), which was also used to generate a natural language description that was subsequently edited further.

Taxonomy

Family ANAMIDAE Simon, 1889

Subfamily ANAMINAE Simon, 1889

Genus *Aname* L. Koch, 1873

Type species

Aname pallida L. Koch, 1873, by monotypy.

Diagnosis

See Harvey et al. (2018).

Description

See Harvey et al. (2018).

Aname elegans Harvey, Wilson & Rix, sp. nov.

Figures 1–17

ZooBank LSID: http://zoobank.org/NomenclaturalActs/CEE7F841-D94B-4222-ADC3-C5ED3C41747E

Material examined

Holotype

AUSTRALIA: *South Australia:* ♂, Hiltaba Station, 32°14'S, 135°13'E, 18 November 2012, B. Baehr (SAM NN28061).

Paratype

AUSTRALIA: *South Australia:* 1 ♂, Hiltaba Station, 32°14'S, 135°13'E, 12–21 November 2012, B. Baehr (SAM NN28059).

Diagnosis

Males of *Aname elegans* can be distinguished from most other *Aname* species by the shape of the embolus, which is short (roughly the same length as the bulb), thin at the base such that it is clearly demarcated from the bulb, and tapers evenly to a point (Figures 11–13). Other species with a similar embolus conformation include *A. aragog* Harvey, Framenau, Wojcieszkek, Rix & Harvey, 2012, *A. camara* Raven, 1985, *A. kirrama* Raven, 1984, *A. mccleeryorum* Harvey & Huey, 2020, and *A. lillianae* Harvey & Huey, 2020. Males of *A. elegans* can be distinguished from *A. aragog* and *A. mccleeryorum* by the presence of five strong spines on the prolateral palpal tibia (one in both *A. aragog* and *A. mccleeryorum*); from *A. camara* by the shorter proximal excavation on metatarsus I relative to metatarsus length (Figure 17); from *A. kirrama* by a shorter megaspine on tibia I, and a more distinct proximal excavation on metatarsus I (Figures 15–17); and from *A. lillianae*, to which it is quite similar, by the lightly hirsute carapace (Figure 1).

Females of *A. elegans* are unknown.

Description

Male (based on holotype, SAM NN28061)

Medium-large anamid spider (total body length 20.4).

Colour (in alcohol) (Figures 1–17): carapace uniformly red-brown; leg I red-brown, legs II to IV uniformly yellow-brown; chelicerae red brown almost black; abdomen dorsally pale creamy-yellow with grey-brown markings, and ventrally pale yellow-brown.

Cephalothorax: carapace (Figure 1) 1.21 x longer than broad; pilose; silver hairs present, with brown bristles dorsally; clypeal edge slightly convex; fovea straight (Figure 4). Eyes (Figure 3) on distinct mound; from above, anterior eye row straight, posterior eye row slightly recurved; AME about same size as ALE; ALE and AME the largest; PME smallest.

Chelicerae (Figure 1) with broad dorsal strip of black setae, and two thinner lateral strips of smaller black setae; rastellum absent; promargin of tooth row with 11 teeth, retromargin with 3 teeth. Labium (Figure 5) fused to sternum; without cuspules. Left maxilla (Figure 9) with 59 cuspules; located on basal third. Maxillae about same colour as coxae I–IV (Figure 2). Sternum (Figure 5): oval, posteriorly pointed; 1.27 x longer than broad; with setae over entire surface; with 3 pairs of sigilla, each pair increasing in size from anterior to posterior; posterior pair elongate and slightly curved; anterior and median pairs located near edge of sternum (Figure 8).

Pedipalp (Figures 10–13): tibia cylindrical, narrow; prolateral face with 5 strong spines clustered in distal half, and 2 strong spines on ventral face; asetose depression present, about the length of embolus; PDL/PTL 0.56; tarsus short, broadest distally; with thick scopula; bulb ovoid; embolus slightly longer than bulb, gently curved.

Legs (Figures 14–17): coxal cuspules absent. Tibia I moderately thickened; with large megaspur; TIL/TID 3.40; TIS/TIL 0.51; TISH/TID 0.60; metatarsus incrassate; MIL/MID 5.00; MIPEL/MIL 0.50; scopula present on all tarsi, absent on metatarsi.

Abdomen (Figures 6, 7): 1.73 x longer than broad, densely pilose.

Dimensions (mm): total body length (with chelicerae, but excluding spinnerets) 20.4. Carapace length 8.9, width 7.4; sternum length 4.2, width 3.4; abdomen length 7.6, width 4.3. Legs: femur I length 6.9; tibia I length 5.0; metatarsus I length 5.5; femur II length 6.2; femur III length 5.5; femur IV length 6.8.

Variation (N = 1): carapace length 9.9; width 8.1; femur I length 7.9; metatarsus I length 5.9.

Remarks

There are five other species of *Aname* described from south-eastern Australia: *Aname comosa* Rainbow & Pulleine, 1918 from Pichi Richi (Flinders Lofty Block bioregion), *A. grandis* Rainbow & Pulleine, 1918 from Pichi Richi and Woolshed Flat (Flinders Lofty Block bioregion), *A. mainae* Raven, 2000 from near Elliston (Eyre Yorke Block bioregion), *A. hirsuta* Rainbow & Pulleine, 1918 from Mallala (Eyre Yorke Block bioregion), and *A. robusta* Rainbow & Pulleine, 1918 from Mannum (Murray Darling Depression bioregion). The molecular phylogeny presented by Rix et al. (2021) demonstrates that *A. elegans* is not conspecific with *A. mainae*, the latter of which belongs to the Continental Radiation. The four other *Aname* species are known only from females (Rainbow and Pulleine 1918), and are currently impossible to separate from *A. elegans* without a more detailed study of all species in the region and by collecting females of *A. elegans*. However, we choose to name the Gawler Range species as it occurs in a different bioregion to *A. comosa*, *A. grandis*, *A. hirsuta* and *A. robusta*, and few species of *Aname* have a distribution shared between major biogeographic areas as defined by Rix et al. (2021).

This species was included in a recent molecular phylogeny of the genus *Aname* under the code name *Aname* 'MYG462', and belongs to Clade 4 of the Temperate-Eastern Radiation (Rix et al. 2021).

Sequence data

The following sequence data are available on GenBank for this species (Rix et al. 2021):

Holotype male, SAM NN28061: *COI* (MG800140), 12S rRNA (MG799857), 16S rRNA (MG799918), 18S rRNA (MG799987), 28S rRNA (MG800064), *H3* (MG800262), *EF1-gamma* (MW518674).

Paratype male, SAM NN28059: *COI* (MW518617), 12S rRNA (MW518258), 16S rRNA (MW518357), 18S rRNA (MW518451), 28S rRNA (MW518528).

Distribution

Aname elegans has been collected from Hiltaba Nature Reserve which is situated in the Gawler Ranges, South Australia within the Gawler IBRA 7.0 bioregion.

Etymology

The species epithet refers to the beauty of this species (*elegans*, Latin, tasteful, choice, fine, select) (Brown 1956).

Aname pulchella Harvey, Wilson & Rix, sp. nov.

Figures 18–35

ZooBank LSID: http://zoobank.org/NomenclaturalActs/B0CCD124-034D-4606-A4FC-EE50702A6ECA

Material examined

Holotype

AUSTRALIA: *Western Australia:* ♂, Madura Caravan Park, 31°54’02"S, 127°01’14"E, 12 September 2017, J.M. Waldock, M.J. Hillyer, M.S. Harvey (WAM T144388).

Paratype

AUSTRALIA: *Western Australia:* 1 ♂, Madura Caravan Park, 31°54’02"S, 127°01’14"E, 10 September 2017, M.J. Hillyer (WAM T144353).

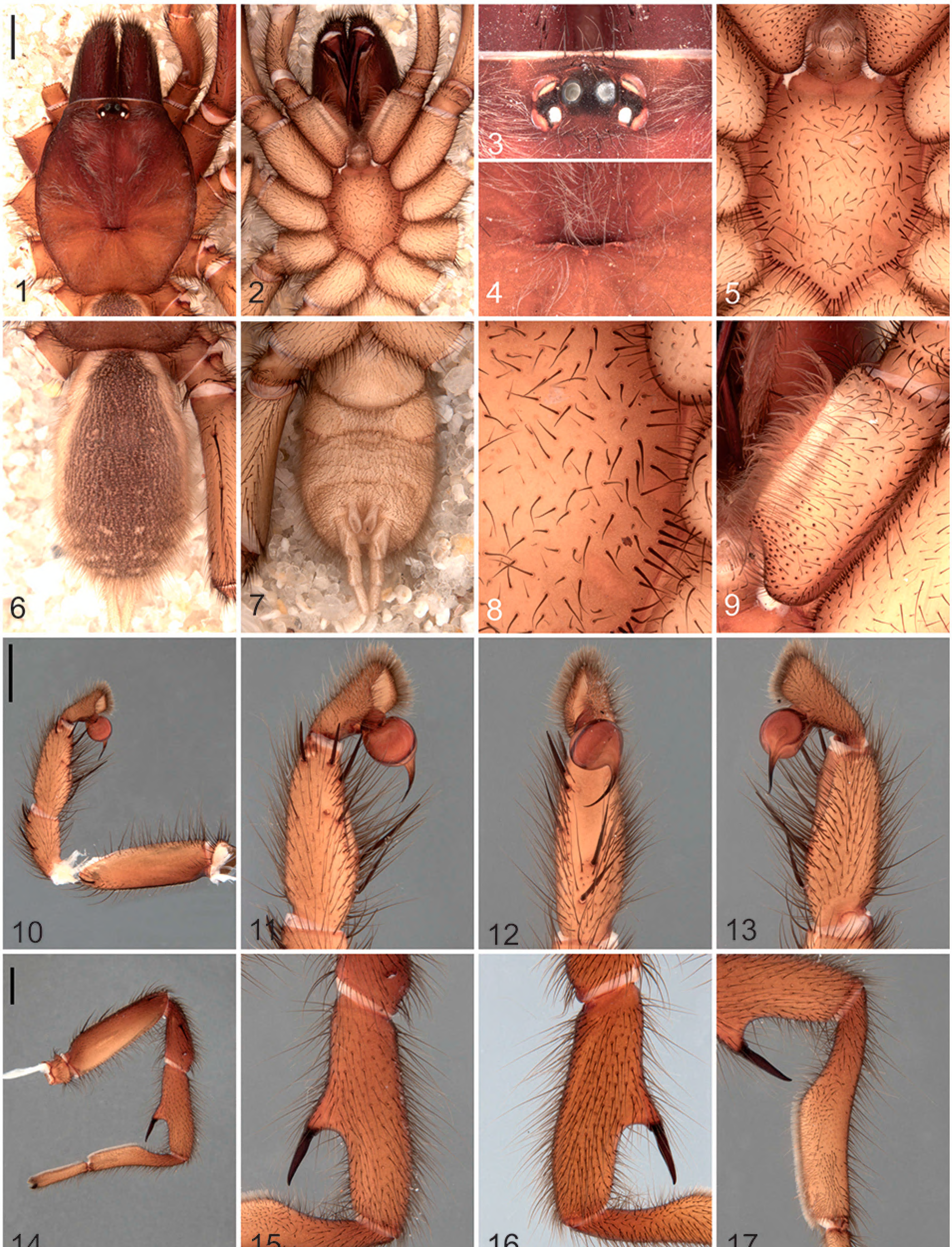
Other material

AUSTRALIA: *Western Australia:* 1 ♂, Dundas Nature Reserve, Mt Andrew Track, 32°30'57"S, 122°51'45"E, dry pitfall trap, mallee, 24 October 2009, S. Comer (WAM T101551); 1 ♂, Dundas Nature Reserve, Mt Andrew Track, 32°30'56"S, 122°51'43"E, October 2009, dry pitfall, S. Comer (WAM T101556).

Diagnosis

Males of *Aname pulchella* can be distinguished from all *Aname* species not from Western Australia except *A. barrema, A. distincta, and A. inimica* by a bulb which tapers uniformly into the embolus such that the bulb and embolus are not clearly demarcated (Figures 29–31). *Aname pulchella* can be distinguished from *A. inimica* by a longer embolus and a longer asetose depression relative to the palpal tibia length (Figure 30); and from *A. distincta* and *A. barrema* by the presence of scopulae on all tarsi (Figure 32).

Males of *Aname pulchella* can be distinguished from most described *Aname* species from Western Australia



Figures 1–17. *Aname elegans* Harvey, Wilson & Rix, sp. nov., holotype male (SAM NN28061): 1, cephalothorax, dorsal view; 2, cephalothorax, ventral view; 3, ocular region; 4, fovea; 5, sternum, ventral view; 6, abdomen, dorsal view; 7, abdomen, ventral view; 8, left sternal sigilla, ventral view; 9, left maxilla, ventral view; 10, left pedipalp, prolateral view; 11, left pedipalp, tibia and tarsus, prolateral view; 12, left pedipalp, tibia and tarsus, ventral view; 13, left pedipalp, tibia and tarsus, retrolateral view; 14, left leg I, prolateral view; 15, left leg I, tibia I, prolateral view; 16, left leg I, tibia I, retrolateral view; 17, left leg I, metatarsus I, prolateral view. Scale bars = 2 mm.

by a uniform, dark colouration in combination with silver hairs covering the carapace (Figures 18, 19, 21, 22). Other species which are similarly dark in colour and/or possess silver hairs on the carapace include *A. aragog* Harvey, Framenau, Wojcieszkek, Rix & Harvey, 2012, *A. ellenae* Harvey, Framenau, Wojcieszkek, Rix & Harvey, 2012, *A. exulans* Harvey & Huey, 2020, *A. mccleeryorum* Harvey & Huey, 2020, *A. marae* Harvey, Framenau, Wojcieszkek, Rix & Harvey, 2012, *A. lorica* Castalanelli, Framenau, Huey, Hillyer & Harvey, 2020, *A. sinuata* Castalanelli, Framenau, Huey, Hillyer & Harvey, 2020, and *A. watsoni* Castalanelli, Framenau, Huey, Hillyer & Harvey, 2020. *Aname pulchella* can be distinguished from *A. aragog* and *A. mccleeryorum* by an asetose depression which is clearly over half the length of the palpal tibia (PDL/PTL 0.68) (Figure 31); from *A. ellenae* and *A. sinuata* by the absence of a patch of short, strong setae on the retrolateral palpal tibia (Figure 31); from *A. exulans* by the absence of an abdominal chevron pattern (Figure 24); from *A. marae* by the much longer embolus relative to the length of the bulb (Figures 30, 31) and by the presence of more cuspules on the maxillae (ca. 180 in comparison with <100), which extend onto the maxillary heel (Figure 27). *Aname pulchella* is morphologically most similar to *A. lorica* and *A. watsoni*, but can be distinguished from *A lorica* by silver hairs on the carapace (Figure 19) and by a bulb which tapers uniformly into the embolus such that the bulb and embolus are not clearly demarcated (Figures 29–31); and from *A. watsoni* by a less robust metatarsus I (MIL/MID 4.78 in comparison with 3.49) (Figure 35).

Females of *A. pulchella* are unknown.

Description

Male (based on holotype, WAM T144388)

Medium-sized anamid spider (total body length 19.1).

Colour (in alcohol) (Figures 19–35): carapace with cephalic region deep red-brown, thoracic region yellow-brown; leg I dark brown, legs II-IV yellow-brown, distal segments slightly paler; chelicerae brown; abdomen dorsally grey-brown, and ventrally pale yellow-brown.

Cephalothorax: carapace (Figure 19) 1.28 × longer than broad; densely pilose; silver hairs and several brown setae; clypeal edge slightly convex; fovea straight (Figure 22). Eyes (Figure 21) on distinct mound; from above, anterior eye row straight, posterior eye row slightly recurved; AME about same size as ALE; ALE and AME the largest; PME smallest. Chelicerae (Figure 19) with broad dorsal strip of black setae, and two thinner lateral strips of smaller black setae; rastellum absent; promargin of tooth row with 10 teeth, retromargin with 3 teeth. Labium (Figure 23) fused to sternum; without cuspules. Left maxillae (Figure 27) with ca. 180 cuspules, located on basal third. Maxillae about same colour as coxae I–IV (Figure 20). Sternum (Figure 23): oval, posteriorly pointed; 1.23 × longer than broad; with setae over entire surface; with 3 pairs of sigilla (Figure 26), each pair increasing in size from anterior to posterior; posterior pair elongate and slightly curved; anterior and median pairs located near edge of sternum.

Pedipalp (Figures 28–31): tibia cylindrical, narrow; prolateral face with 2 strong spines clustered in distal half, and 2 strong spines on ventral face; asetose depression present, about the length of embolus; PDL/PTL 0.68; tarsus short, broadest distally; with thick scopula; bulb ovoid; embolus longer than bulb, gently curved, without obvious demarcation between embolus and bulb.

Legs (Figures 32–35): coxa I with 1–2 cuspules near mesal edge (Figure 27). Tibia I moderately thickened; with large megaspur; TIL/TID 3.61; TIS/TIL 0.53; TISH/TID 0.74; metatarsus incrassate, widest in basal third; MIL/MID 4.78. MIPEL/MIL 0.43; scopula present on all tarsi, and on metatarsi I and II.

Abdomen (Figures 24, 25): 1.83 × longer than broad, densely pilose.

Dimensions (mm): total body length (with chelicerae, but excluding spinnerets) 19.1. Carapace length 7.4, width 5.8; sternum length 3.7, width 3.0; abdomen length 8.4, width 4.6. Legs: femur I length 6.1; tibia I length 4.5; metatarsus I length 4.8; femur II length 5.1; femur III length 4.3; femur IV length 5.6.

Variation (N = 3): carapace length 7.8–8.6, width 5.9–7.6; femur I length 6.5–7.6; metatarsus I length 4.9–5.9; femur IV length 6.3–7.2.

Remarks

This species was included in a recent molecular phylogeny of the genus *Aname* under the code name *Aname* 'MYG590', and belongs to Clade 5 of the Temperate-Eastern Radiation (Rix et al. 2021). The two populations, from Madura and Dundas Nature Reserve, have a *COI* divergence value of 4.6%.

Sequence data

The following sequence data are available on GenBank for this species (Rix et al. 2021):

Holotype male, WAM T144388: *COI* (MW518669), 12S rRNA (MW518350), 16S rRNA (MW518444), 28S rRNA (MW518610), *H3* (MW518802).

Male, WAM T101551: *COI* (MW518637), 12S rRNA (MW518301), 16S rRNA (MW518401), 18S rRNA (MW518489), 28S rRNA (MW518570), *H3* (MW518765).

Distribution

Aname pulchella has been collected from two localities in south-eastern Western Australia. Two males were collected running on the ground at night at the Madura Caravan Park, located in the Hampton IBRA 7.0 bioregion, and two males were collected in Dundas Nature Reserve, located in the Mallee IBRA 7.0 bioregion. These

Figure 18. *Aname pulchella* Harvey, Wilson & Rix, sp. nov., holotype male (WAM T144388).

two localities are ca. 400 km apart, and situated in mallee woodland habitats.

Etymology

The species epithet refers to the beauty of this species (*pulchellus*, Latin, diminutive of *pulchra*, beautiful, pretty, fine, lovely) (Brown 1956).

Acknowledgments

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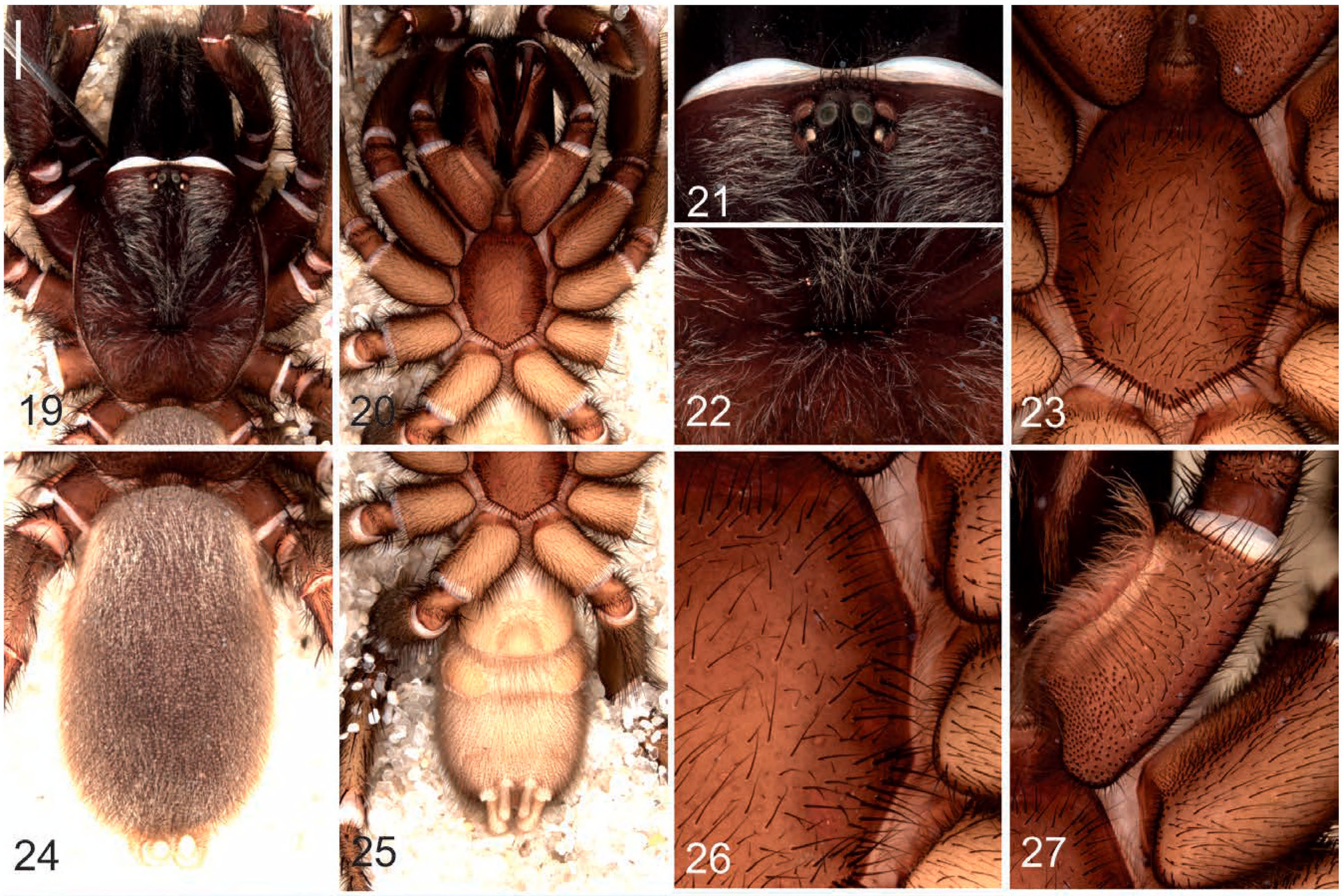

Figures 19–35. *Aname pulchella* Harvey, Wilson & Rix, sp. nov., holotype male (WAM T144388): 19, cephalothorax, dorsal view; 20, cephalothorax, ventral view; 21, ocular region; 22, fovea; 23, sternum, ventral view; 24, abdomen, dorsal view; 25, abdomen, ventral view; 26, left sternal sigilla, ventral view; 27, left maxilla, ventral view; 28, left pedipalp, prolateral view; 29, left pedipalp, tibia and tarsus, prolateral view; 30, left pedipalp, tibia and tarsus, ventral view; 31, left pedipalp, tibia and tarsus, retrolateral view; 32, left leg I, prolateral view; 33, left leg I, tibia I, prolateral view; 34, left leg I, tibia I, retrolateral view; 35, left leg I, metatarsus I, prolateral view. Scale bars = 2 mm.

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